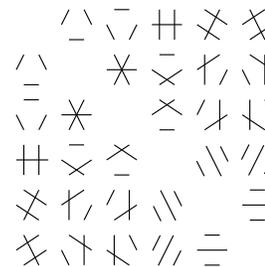


# Mathematics Seminar



## Rocky Mountain Algebraic Combinatorics Seminar

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### Normal supercharacter theories and Hopf structures

Farid AliniaEIFARD  
University of Colorado, Boulder

The concept of Hopf algebras originated from the theory of algebraic groups and algebraic topology in the mid 20th century and now it has many application in algebraic combinatorics. Also, the notion of a Hopf monoid in the monoidal category of linear species was introduced by Aguiar and Mahajan, and they show the great importance of this concept in algebraic combinatorics with examples that shows many combinatorial objects have Hopf monoid structures. Hopf structures have numerous applications in many other mathematical branches, and now it is a familiar concept in representation theory as the class functions or superclass functions of some tower of groups have Hopf structures where representation theoretic functors give the product and coproduct. In this talk, we give a brief introduction to normal supercharacter theories and Galois character theories, and then we construct several Hopf structure by using these supercharacter theories. (With Nat Thiem and Shawn Burkett)

### Subgroups of simple groups of Lie type are maximally diverse

Brady Tyburski  
Colorado State University

Highly symmetric geometries over vector spaces over fields are the source of all but one infinite family of simple groups. These groups of Lie type have rigid properties labeled by the delicate geometries organized by Dynkin diagrams and Chevalley's commutator formulas which govern their products. Being simple, these groups have enormous conjugacy classes forcing many subgroups to be isomorphic and allowing for several classification projects of these subgroups.

In this talk, we demonstrate this rigidity is an illusion. Simple groups of Lie type and order  $n$  have  $n^{\Theta(\log n)}$  pairwise non-isomorphic subgroups the most possible for any group of order  $n$ . Similar counts for the number of conjugacy classes apply, too.

Weber 223  
4–6 pm  
Friday, Sep 28, 2018  
(Refreshments in Weber 117, 3:30–4 pm)  
Colorado State University

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This is a joint Denver U / UC Boulder / UC Denver / U of Wyoming / CSU seminar that meets biweekly.  
Anyone interested is welcome to join us at a local restaurant for dinner after the talks.



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